

What is claimed is:

1 1. A polymer gel display, comprising:

2 a first substrate;

3 a polymer-gel sheet disposed on the first substrate,
4 with two ends fixed thereto and a flexible
5 center area;

6 a pair of second spacers disposed on the two ends of
7 the polymer-gel sheet to fix the two ends to
8 the first substrate;

9 a second substrate disposed on the first substrate
10 with a preset gap therebetween, such that the
11 polymer-gel sheet contacts the second substrate
12 when the center area is flexed and displays via
13 the second substrate; and

14 a fluid layer between the first and second
15 substrates.

1 2. The polymer gel display as claimed in claim 1,
2 further comprising a first conducting layer between the
3 first substrate and the polymer-gel sheet, and a second
4 conducting layer between the second substrate and the
5 polymer-gel sheet.

1 3. The polymer gel display as claimed in claim 2,
2 wherein the second conducting layer is disposed between
3 the second substrate and the second spacers.

1 4. The polymer gel display as claimed in claim 2,
2 wherein the second conducting layer is disposed between
3 the polymer-gel sheet and the second spacers.

1 5. The polymer gel display as claimed in claim 4,
2 wherein the second spacers are conducting spacers.

1 6. The polymer gel display as claimed in claim 1,
2 further comprising a pair of first spacers between the
3 polymer-gel sheet and the first substrate, wherein the
4 first spacers are disposed corresponding to the second
5 spacers such that the center area of the polymer-gel
6 sheet is suspended over the first substrate.

1 7. The polymer gel display as claimed in claim 6,
2 further comprising a first conducting layer between the
3 first substrate and the polymer-gel sheet, and a second
4 conducting layer between the second substrate and the
5 polymer-gel sheet.

1 8. The polymer gel display as claimed in claim 7,
2 wherein the second conducting layer is disposed between
3 the second substrate and the second spacers, and the
4 first conducting layer is disposed between the first
5 substrate and the first spacers.

1 9. The polymer gel display as claimed in claim 7,
2 wherein the second conducting layer is disposed between
3 the polymer-gel sheet and the second spacers, and the
4 first conducting layer is disposed between the polymer-
5 gel sheet and the first spacers.

1 10. The polymer gel display as claimed in claim 7,
2 wherein the first and second spacers are conducting
3 spacers.

1 11. The polymer gel display as claimed in claim 1,
2 wherein the first and second substrates are transparent
3 glass substrates.

1 12. The polymer gel display as claimed in claim 1,
2 wherein the polymer-gel sheet is a PMMA (polymethyl
3 methacrylate)-gel, polyamide-gel, or polyvinyl fluoride-
4 gel sheet.

1 13. The polymer gel display as claimed in claim 1,
2 wherein the polymer-gel sheet is colored.

1 14. The polymer gel display as claimed in claim 1,
2 wherein the polymer-gel sheet comprises a black pigment.

1 15. The polymer gel display as claimed in claim 1,
2 wherein the polymer-gel sheet comprises a white pigment.

1 16. The polymer gel display as claimed in claim 1,
2 further comprising an ion-exchange film on the polymer-
3 gel sheet.

1 17. The polymer gel display as claimed in claim 1,
2 wherein the fluid layer further comprises an electrolyte.

1 18. The polymer gel display as claimed in claim 1,
2 wherein the fluid layer further comprises a pigment.

1 19. The polymer gel display as claimed in claim 1,
2 wherein the fluid layer further comprises a black
3 pigment.

1 20. The polymer gel display as claimed in claim 1,
2 wherein the fluid layer further comprises a white
3 pigment.

1 21. The polymer gel display as claimed in claim 1,
2 wherein the fluid layer further comprises gas.

1 22. A fabrication method of a polymer-gel display,
2 comprising:

3 providing a first substrate;

4 disposing a polymer-gel sheet on the first
5 substrate, with two ends fixed thereon and a
6 flexible center area;

7 disposing a pair of second spacers on the two ends
8 of the polymer-gel sheet to fix the two ends to
9 the first substrate;

10 disposing a second substrate on the first substrate
11 with a preset gap therebetween, such that the
12 polymer-gel sheet contacts the second substrate
13 when the center area is flexed and displays via
14 the second substrate; and

15 disposing a fluid layer between the first and second
16 substrates.

1 23. The fabrication method as claimed in claim 22,
2 further comprising disposing a first conducting layer
3 between the first substrate and the polymer-gel sheet,
4 and a second conducting layer between the second
5 substrate and the polymer-gel sheet.

1 24. The fabrication method as claimed in claim 23,
2 wherein the second conducting layer is disposed between
3 the second substrate and the second spacers.

1 25. The fabrication method as claimed in claim 23,
2 wherein the second conducting layer is disposed between
3 the polymer-gel sheet and the second spacers.

1 26. The fabrication method as claimed in claim 25,
2 wherein the second spacers are conducting spacers.

1 27. The fabrication method as claimed in claim 22,
2 further comprising disposing a pair of first spacers
3 between the polymer-gel sheet and the first substrate,
4 whereby the first spacers are disposed corresponding to
5 the second spacers such that the center area of the
6 polymer-gel sheet is suspended over the first substrate.

1 28. The fabrication method as claimed in claim 27,
2 further comprising disposing a first conducting layer
3 between the first substrate and the polymer-gel sheet,
4 and a second conducting layer between the second
5 substrate and the polymer-gel sheet.

1 29. The fabrication method as claimed in claim 28,
2 wherein the second conducting layer is disposed between
3 the second substrate and the second spacers, and the
4 first conducting layer is disposed between the first
5 substrate and the first spacers.

1 30. The fabrication method as claimed in claim 28,
2 wherein the second conducting layer is disposed between

3 the polymer-gel sheet and the second spacers, and the
4 first conducting layer is disposed between the polymer-
5 gel sheet and the first spacers.

1 31. The fabrication method as claimed in claim 28,
2 wherein the first and second spacers are conducting
3 spacers.

1 32. The fabrication method as claimed in claim 22,
2 wherein the first and second substrates are transparent
3 glass substrates.

1 33. The fabrication method as claimed in claim 22,
2 wherein the polymer-gel sheet is a PMMA (polymethyl
3 methacrylate)-gel, polyamide-gel, or polyvinyl fluoride-
4 gel sheet.

1 34. The fabrication method as claimed in claim 22,
2 wherein the polymer-gel sheet is colored.

1 35. The fabrication method as claimed in claim 22,
2 wherein the polymer-gel sheet comprises a black pigment.

1 36. The fabrication method as claimed in claim 22,
2 wherein the polymer-gel sheet comprises a white pigment.

1 37. The fabrication method as claimed in claim 22,
2 further comprising forming an ion-exchange film on the
3 polymer-gel sheet.

1 38. The fabrication method as claimed in claim 22,
2 wherein the fluid layer further comprises an electrolyte.

1 39. The fabrication method as claimed in claim 22,
2 wherein the fluid layer further comprises a pigment.

1 40. The fabrication method as claimed in claim 22,
2 wherein the fluid layer further comprises a black
3 pigment.

1 41. The fabrication method as claimed in claim 22,
2 wherein the fluid layer further comprises a white
3 pigment.

1 42. The fabrication method as claimed in claim 22,
2 wherein the fluid layer further comprises gas.

1 43. An operating structure of a polymer-gel
2 display, utilizing the flexing of a polymer-gel sheet to
3 enable the display, comprising:

4 a pair of substrates with a preset gap therebetween;
5 a polymer-gel sheet of a first color disposed
6 between the substrates, contacting no more than
7 one of the substrates, having two fixed ends
8 and a flexible center area; and

9 a fluid layer of a second color between the
10 substrates, displaying the second color via the
11 substrate not contacting the polymer-gel sheet,
12 wherein the center area of the polymer-gel sheet
13 flexes toward the substrate originally not
14 contacted thereby when an external electric
15 field is applied, such that the first color of
16 the polymer-gel sheet is displayed via the

17 substrate after the polymer-gel sheet and the
18 substrate make contact.

1 44. The operating structure as claimed in claim 43,
2 wherein the substrate originally not contacting the
3 polymer-gel sheet is a transparent glass substrate.

1 45. The operating structure as claimed in claim 43,
2 wherein the polymer-gel sheet is a PMMA (polymethyl
3 methacrylate)-gel, polyamide-gel, or polyvinyl fluoride-
4 gel sheet.

1 46. The operating structure as claimed in claim 43,
2 wherein the polymer-gel sheet further comprises an ion-
3 exchange film formed thereon.

1 47. The operating structure as claimed in claim 43,
2 wherein the fluid layer further comprises an electrolyte.